IDSP

Industrial
Disease
Standards
Panel

IDSP

Report to the Workers' Compensation Board on Cor Pulmonale

July 1992

93-00172/

Report to the Workers' Compensation Board on Cor Pulmonale

Industrial Disease Standards Panel

In 1985 the Ontario legislature established the Industrial Disease Standards Panel (IDSP) to investigate and identify diseases related to work. The Panel is independent of both the Ministry of Labour and the Workers' Compensation Board. At the end of each fiscal year the WCB reimburses the Ministry for the Panel's expenditures.

The Panel's authority flows from section 95 of the *Workers' Compensation Act* and its functions are set out as follows:

(8) (a) to investigate possible industrial diseases;

(b) to make findings as to whether a probable connection exists between a disease and an industrial process, trade or occupation in Ontario;

(c) to create, develop and revise criteria for the evaluation of claims respecting industrial diseases; and

(d) to advise on eligibility rules regarding compensation for claims.

Decisions of the Panel are made by its members who represent labour, management, scientific, medical and community interests. Once the Panel makes a finding, the WCB is required to publish the Panel's report in the Ontario Gazette and solicit comments from interested parties. After considering the submissions the WCB Board of Directors decide if the Panel's recommendations are to be implemented, amended or rejected.

To assist with its work the Panel has a small staff of researchers, analysts and support people. In addition to its own staff, the Panel relies heavily on the advice of outside experts in science, medicine and law, as well as input from the parties of interest.

Canadian Cataloguing in Publication Data

Main entry under title:
Report to the Workers' Compensation Board on cor pulmonale

(IDSP report, ISSN 0840-7274 ; no. 10)
Includes bibliographical references.
IBSN 0-7778-0019-5

1. Cor pulmonale. I. Ontario, Industrial Disease Standards Panel. II. Series.

RC685.C55R46 1992 616.1'2 C92-092572-3

Additional copies of this publication are available in writing:
Industrial Disease Standards Panel
69 Yonge Street, Suite 1004
Toronto, Ontario M5E 1K3
(416) 327-4156

July 1992

Panel Membership

Panel Members	*Appointment*
Ms. Nicolette Carlan (Chair)	May 16, 1991 to May 15, 1994
Dr. Carol Buck	June 1, 1991 to June 16, 1994
Mr. James Brophy	January 23, 1992 to January 22, 1995
Mr. William Elliott	November 7, 1991 to November 6, 1994
Mr. David Leitch	November 7, 1991 to November 6, 1994
Mr. John Macnamara	November 7, 1991 to November 6, 1994
Mr. Homer Seguin	May 28, 1992 to May 27, 1995
Dr. Michael Wills	November 7, 1991 to November 6, 1994

Panel Staff

Panel Staff	*Title*
Carolyn Archer	Senior Research Officer
Heather Goldstein	Researcher
David Lampert	Counsel
Francis Macri	Policy Analyst
Cara Melbye	Policy Analyst
Susan Meurer	Policy Analyst
John Risk	Researcher
Tracy Soyka	Secretary
Salima Storey	Administrative Officer

Ontario Ministry of Labour
Ministère du Travail de l'Ontario

Industrial Disease Standards Panel
Comité des normes en matière de maladies professionnelles

69 Yonge Street
10th Floor
Toronto, Ontario
M5E 1K3

Telephone: 416/327-4156
Facsimile : 416/327-4166

69, rue Yonge
10e étage
Toronto (Ontario)
M5E 1K3

Téléphone: 416/327-4156
Facsimilé : 416/327-4166

July 31, 1992

Mr. Odoardo Di Santo
Chair
Workers' Compensation Board
2 Bloor Street East
20th Floor
Toronto, Ontario
M4W 3C3

Dear Mr. Di Santo:

I am pleased to present you with the "IDSP Report to the Workers' Compensation Board on Cor Pulmonale" in accordance with section 95(11) of the Workers' Compensation Act.

Yours sincerely,

Nicolette Carlan
Chair

Encl.

The Issue

It has been a long acknowledged medical opinion that a serious breathing impairment can lead to heart disease. The association is well documented and not disputed. Heart problems affecting the right side of the heart and associated with pulmonary dysfunction are known as cor pulmonale.

For compensation purposes the medical association is not at issue but adjudicatory problems have been identified. Workers who are in receipt of benefits for respiratory illness often develop heart problems. There is a concern that these additional problems may not be adequately addressed by the WCB when awarding benefits to the worker or determining entitlement to dependency benefits.

It is easy to understand that the Board would miss some allowable claims when one considers that one-third of the population ultimately dies of heart disease or stroke. Therefore, when Board adjudicators are confronted with information that indicates that a worker has died of heart disease, it would be reasonable to assume that the death was not a result of the compensable illness and the file should be closed. Even when the possibility of work-related heart disease is identified, it is often not possible to sort out the relationship between heart disease related to work and non-work-related disease. As a consequence, the widows of workers who have suffered from compensable respiratory illness and died of related illness may not receive the benefits to which they are entitled.

The issue, although limited to asbestotics at the time, was raised during the public hearings before The Royal Commission on Asbestos [RCA] in 1980. As a result the Commission in Recommendation 13.9 formally advised the Workers' Compensation Board to devise an eligibility rule for survivors of those workers who suffer from mild or moderate impairment from asbestosis and who die from cor pulmonale(1).

Concerns about adjudicative problems must have also been shared by then Chairman of the WCB, Dr. Robert Elgie, because in a letter dated March 5, 1987, he asked the Panel to "develop such an eligibility rule [for cor pulmonale] to indicate under what circumstances survivors will become eligible to these benefits."

The Panel accepted the referral and incorporated this investigation in its on-going review of the recommendations of RCA. The Panel expanded the scope of the inquiry and chose to look at the adjudicative problems associated with the payment of dependency benefits for all claims for pneumoconiosis, not simply asbestosis.

The Investigatory Process

Since the time of the original referral from the Workers' Compensation Board in March, 1987, the issue of cor pulmonale has arisen indirectly as the Panel has pursued other investigations.

The Panel decided to broaden the previous Agenda item. The broader issue became **"death from cor pulmonale (or other cardiovascular disease) among workers with a prior diagnosis of any pneumoconiosis."**

In 1989 the Panel contemplated commissioning Dr. W. Nicholson from Mount Sinai Hospital in New York to undertake a review of cause of death data for asbestotics. Eventually this project was abandoned because the data was not available. Inquiries were made and the Ministry of Labour was able to provide the Panel with some statistical information about the incidence of cor pulmonale and pneumoconiosis.

In January of 1992, the Panel wrote to three respirologists, for advice on the disease process.

The Panel reviewed the Workers' Compensation legislation and contacted other Canadian Boards to obtain any policies or guidelines concerning death from cor pulmonale or any other cardiovascular disease among workers with a prior diagnosis of occupationally related chest disease. Responses were received from Alberta, Nova Scotia, Yukon, Newfoundland and Labrador, Saskatchewan, and New Brunswick.

This report will deal with only the problems associated with cor pulmonale. In a further report the Panel will address the adjudicative problems associated with additional respiratory factors that complicate the adjudication of claims for respiratory illnesses.

The Nature of the Condition

The term "cor pulmonale" denotes enlargement of the right ventricle of the heart secondary to pulmonary malfunction(2). Cor pulmonale does not automatically imply **right heart failure**. However, if the pulmonary hypertension that led to the enlarged heart is not relieved, it can be expected that the right ventricle will fail. A more precise definition is preferred by Morgan, who describes it as "heart failure resulting from lung disease and is recognised by **an increase in the right** ventricular and pulmonary artery pressures **in the absence of left** ventricular failure"(3).

One function of the lungs is to exchange gases, specifically oxygen and carbon dioxide. This exchange occurs in the alveoli, or air sacs, and capillaries in the lung. The oxygen from the air breathed diffuses into the blood through the thin alveolar wall and the carbon dioxide in the blood diffuses out. The average adult lung con-

tains some 300 million alveoli supplied with a network of blood vessels so extensive "it is best described as a pool of blood"(4). This network is the densest concentration of blood vessels in the body.

Ordinarily, this enormous reserve allows blood to circulate through healthy lungs so easily that the relatively weak right ventricle of the heart can function without increased blood pressure, even if half the volume of both lungs is removed surgically. "It is an extraordinarily efficient, low resistance system"(2).

However, if this blood vessel supply is sufficiently reduced, increased pressure in the pulmonary artery [pulmonary hypertension] may lead first to over-development of the right heart [which simply has to work harder to get the blood through the lungs] and finally to right heart failure. It is this pulmonary hypertension that leads to cor pulmonale.

Lung disease that can seriously impair normal lung function is usually described as either restrictive or obstructive. Restrictive disease basically refers to a "restriction" on the volume of air in the lung. It involves the alveoli and supporting tissue of the lung as opposed to the airways themselves. Diseases resulting in pulmonary fibrosis, such as asbestosis, would be typical.

Recent texts on occupational health or occupational lung disease clearly acknowledge the association between the pneumoconioses and cor pulmonale as a possible sequelae. "The fibrotic lung lesions frequently calcify and there is a progressive restrictive lung disease leading to cor pulmonale"(6). "Right-sided congestive heart failure may occur as the result of pulmonary hypertension secondary to some form of severe lung disease. Severe asbestosis, silicosis or any severe occupational lung disease may cause right-sided congestive heart failure"(7). "Classic silicosis may progress to conglomerate disease...the terminal stages may be marked by CO_2 retention, chronic anoxia, and the development of cor pulmonale"(4).

Obstructive diseases, on the other hand, reflect an abnormality in flow of the air through the tubes in the lungs. Emphysema and chronic bronchitis are examples. The most common cause of chronic cor pulmonale is chronic obstructive pulmonary disease [COPD](2). These diseases are widespread in the population in general and most commonly associated with long term cigarette smoking(5). Acute reversible episodes of cor pulmonale can occur in COPD patients, usually during acute respiratory infections. As many as half of the patients with severe obstructive lung disease have cor pulmonale.(2)

Some diseases may have both a restrictive and an obstructive pattern. Although the pathological changes ensuing differ, both types, if severe enough can lead to cor pulmonale.

Most diffuse respiratory diseases do not affect the alveolar gas exchange sufficiently to initiate the train of events leading to cor pulmonale. Even patients with extensive silicosis, emphysema, or diffuse fibrosis **usually** fail to develop appreciable pulmonary hypertension or heart enlargement even though symptoms of breathlessness have occurred for years. However, combined obstructive and restrictive lung disease, which frequently occurs in patients with a restrictive disease who smoke cigarettes, has an especially poor prognosis(2).

Evidence for Ongoing Incidence of the Condition

Individual Panel members drew the Panel's attention to a 1973 publication on silicosis in hardrock miners in Ontario(8). The statistics drawn from tabulations of the Ontario Mining Association include, among other figures, the causes of deaths in silicotic miners from 1926 to 1972. Taken from death certificates, the data shows that for most years between 1959 and 1972 more deaths are attributed to right heart failure than to silicosis or tuberculosis.

Information on 12 deaths attributed to chronic interstitial pneumonia among gold miners was tabled at Panel meeting No. 39, September 12, 1990. Panel minutes of that meeting note that "these cases provide evidence linking a death diagnosis of cor pulmonale (or other heart conditions such as chronic myocarditis or myocardial failure) with pulmonary fibrosis." The Panel was unable to determine from the Board if these cases resulted in the awarding of survivors' benefits.

Fernie et al. found evidence of cor pulmonale in 34% of deceased coal miners with progressive massive fibrosis, regardless of smoking status(9).

Most recently, investigators from the Ontario Ministry of Labour and the Ministry of Health examined hospital discharge data and found that cor pulmonale was diagnosed 22 times more frequently than expected among men diagnosed with a pneumoconiosis(10). Although this data is unpublished and yet to be peer reviewed, it nevertheless would seem to reinforce the view that cor pulmonale is likely to develop in those with a prior diagnosis of fibrotic lung disease.

The Adjudication of Cor Pulmonale

The difficulty in the adjudication of these claims has been identified in several provinces. Both British Columbia and Quebec have chosen to introduce legislative presumptions. Alberta has chosen to simply rely on policy initiatives to assist adjudicators. The other provinces contacted did not have any policies on point.

Ontario
The Panel was unable to ascertain the usual procedure employed by the Board to identify potentially compensable deaths due to cor pulmonale. However, three apparent adjudicative processes have been identified:

1. the Board undertakes an investigation of the cause of death when a claim is submitted by a dependent;

2. the Board undertakes an investigation of the cause of death when the permanent disability for respiratory impairment was rated at 40% or higher. This practice, however, does not form part of any written procedure; and

3. the Board presumably closes the file and takes no further action when a worker who was in receipt of a pension of less than 40% dies.

British Columbia
British Columbia currently compensates all deaths due to lung and heart disease (including myocardial infarctions) among workers under the age of 70 receiving pensions for an occupational respiratory disease in accordance with Section 6(11) of the B.C. Act.

Section 6(11) reads as follows:

> (11) Where a deceased worker was, at the time of his death, under the age of 70 years and suffering from an industrial disease of a type that impairs the capacity [or] function of the lungs, and where the death was caused by some ailment or impairment of the lungs or heart of non-traumatic origin, it shall be conclusively presumed that the death resulted from the industrial disease.

Quebec
Section 95 of Quebec's Industrial Accidents and Occupational Diseases Act specifies that a worker who dies while in receipt of an income replacement indemnity for an occupational disease that could cause death is presumed to have died from that disease. This means that dependency benefits are paid.

Alberta

Two policies potentially affect compensation for cor pulmonale. Policy Statement OCC-4 applies where a permanent and compensable respiratory disability co-exists with a disabling, although non-compensable heart disease. It is presumed that the compensable respiratory disability has enhanced the non-compensable heart disease. Under this policy the Board pays a "supplement" which equals 50% of the clinical rating assigned to the disabling respiratory disease.

When death is attributable to the heart disease, entitlement is governed by the Board's cardiac policy, ADJ-36. Under that policy cardiac conditions are compensable when:

(i) there is evidence of occupational exposure to factors or events known or presumed to be associated with heart problems, and

(ii) the time lapse between the occupational exposure and the onset of the cardiac condition is such that a relationship can be established.

The policy classifies the occupational factors related to cardiac conditions as having either specific causal relationships or presumptive causal relationships. It includes cor pulmonale as an example of a specific causal relationship in which heart disease occurs secondarily to occupational lung disease.

In Summary

Three other provinces have provisions awarding dependency benefits for deaths due to cor pulmonale.

The Panel Consideration of the Evidence

As stated previously there is no medical or scientific dispute. Cor pulmonale is a common finding and can be a contributory cause of death among patients suffering from severe pulmonary disease, especially if chronic hypoxemia (low arterial oxygen) is present. Because of this, the present Panel has extended its recommendations to include all compensable respiratory diseases, not just fibrotic disease.

The Panel also recognizes that cor pulmonale is a common finding among sufferers of Chronic Obstructive Pulmonary Disease, which is usually associated with smoking and can also be associated with work exposure. It is entirely possible that a worker could suffer from a work-related respiratory disease and could also be suffering from another non-work-related respiratory disease and the two could together give rise to cor pulmonale.

In many cases the existence of cor pulmonale has not been diagnosed. Even if the disease is diagnosed, there is often little evidence to assist the adjudicator in distingushing between work and non-work-related causes. British Columbia, for example, has decided that the evidentiary problems are not amenable to resolution. Therefore, to ensure that compensation is paid to all potentially entitled dependents, it enacted legislation that irrebutably presumed a relationship between death and work. Quebec followed the same pattern, except that its presumption is rebuttable.

This Panel has chosen to address the deficiencies in evidence by recommending a monitoring system rather than establishing a presumption of work-relatedness. It is the Panel's view that attempts should be made to diagnose the disease during life and compensate appropriately. The Panel also believes that such monitoring could provide adjudicators with evidence to establish the existence of cor pulmonale and to distingush between work and non-work-related disease not only during the life of the worker, but also at death, so that dependency benefits can be justly awarded.

Panel Findings and Recommendations

Finding 1

The Panel finds a probable connection between compensable respiratory disease and the development of cor pulmonale.

Recommendations

1a. The WCB should investigate the possible existence of cor pulmonale during regular bi-annual assessments of workers receiving benefits for respiratory disease.

1b. The WCB should review the entitlement of workers who are receiving benefits for respiratory disease to insure that their entitlement includes payments for the symptoms of cor pulmonale.

2a. The WCB should investigate the causes of death for all workers who during their lifetimes received benefits for a respiratory disease.

2b. The WCB should pay dependency benefits, if the respiratory disease or a consequence of that disease was a significant factor in the cause of the worker's death or was the sole cause of the death.

References

1. Report of the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario. Ontario Ministry of the Attorney General: Toronto, 1984. Vol. 3, p.764.

2. Fishman, A.P. Cor pulmonale. In: Wilson, J.D.; Braunwald, E., eds. Harrison's Principles of Internal Medicine. 11th ed. Toronto: McGraw-Hill, 1987. p.993–98.

3. Morgan, W.K.C. [Letter to C. Archer]. February 12, 1992.

4. Bates, D.V.; Macklem, P.T.; Christie, R.V. Respiratory Function in Disease. 2nd. ed. Toronto: W.B. Saunders Co., 1971. p.379.

5. Ziskind, M.M. Occupational pulmonary disease. Clinical Symposia (Ciba). Vol. 30, no. 4(1978).

6. Harrington, J.M.; Gill, F.S. Occupational Health. 2nd. ed. London: Blackwell Scientific, 1987. p.76.

7. Fine, L.J. Occupational heart disease. In: Rom, W.N., ed. Environmental and Occupational Medicine. Boston: Little, Brown & Co., 1983. p.363.

8. Patterson, J.F. Silicosis in hardrock miners in Ontario. (Bulletin 173). Toronto: Ontario Ministry of Natural Resources, 1973.

9. Ferni, J.M.; Douglas, A.N.; et al. Right ventricular hypertrophy in a group of coalworkers. Thorax. Vol. 38(1983). p.436–42.

10. Kusiak, R.; Liss, G.M.; Gailitis, M.M. Cor pulmonale and pneumoconiotic lung disease: an investigation using Ontario hospital discharge data. [unpublished draft].